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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,114	01/21/2004	Peter L. Kellerman	02-IMP-005	3916

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EXAMINER
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DHINGRA, RAKESH KUMAR

ART UNIT	PAPER NUMBER
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1792

NOTIFICATION DATE	DELIVERY MODE
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11/21/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

Docketing@eschweilerlaw.com

<b>Office Action Summary</b>	Application No. 10/762,114	Applicant(s) KELLERMAN ET AL.	
	Examiner Rakesh K. Dhingra	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1)  Responsive to communication(s) filed on 19 April 2007.
- 2a)  This action is FINAL.
- 2b)  This action is non-final.
- 3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4)  Claim(s) 1-43 and 45-64 is/are pending in the application.
  - 4a) Of the above claim(s) 2-9, 19-37, 42, 43, 46-53 and 62-64 is/are withdrawn from consideration.
- 5)  Claim(s) \_\_\_\_\_ is/are allowed.
- 6)  Claim(s) 1, 10-18, 38-41, 45 and 54-61 is/are rejected.
- 7)  Claim(s) \_\_\_\_\_ is/are objected to.
- 8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9)  The specification is objected to by the Examiner.
- 10)  The drawing(s) filed on 21 January 2004 is/are: a)  accepted or b)  objected to by the Examiner.
  - Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
  - Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All    b)  Some \*    c)  None of:
    - 1.  Certified copies of the priority documents have been received.
    - 2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    - 3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1)  Notice of References Cited (PTO-892)
- 2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 06/07.
- 4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5)  Notice of Informal Patent Application (PTO-152)
- 6)  Other: \_\_\_\_\_.

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## DETAILED ACTION

### *Response to Arguments*

Applicant's arguments, see pages 14-19 filed 04/19/07, with respect to the rejection(s) of claim(s) 1, 10-18, 38-41, 45, and 54-61 under 35 USC 103 (a) have been fully considered and response is given as follows:

1) Regarding claims 1, 45: Applicant's arguments regarding Walter's apparatus not meeting claim limitation pertaining to the workpiece having its implantation face oriented downwards, and the combination of Koh and Ito not teaching an extraction assembly that is operable to extract ions from a top portion of the chamber, are found to be persuasive. Therefore, the rejections have been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as explained hereunder.

New reference by Satou et al (US Patent No. 4,676,194) reads on claims 1, 45 limitations. Accordingly claims 1, 45 have been rejected under 35 USC 102 (b) as explained below.

2) Regarding Claims 17, 18, 38-41, 60, 61: Applicant's argument that Aisenberg does not teach interstitial pumping apertures that are different from the extraction apertures, as recited in claims 17, 38 and 60 respectively, is not found to be persuasive since Aisenberg teaches that anode 24 with aperture 24A extracts ions and electrons from the plasma source, and serves to maintain the plasma constriction and permits a large fraction of the extracted positive ions to pass through the anode aperture. Aisenberg further teaches that the electrode 26 with aperture 26A separates the higher pressure sputtering chamber 10 from the lower pressure chamber 20, and enables the plasma to pass more efficiently through electrode 26, implying the different functions of the two electrodes. Aisenberg does not teach that apertures 24A, 26A in electrodes 24A, 26A are similar (column 3, line 42 to column 4, line). Thus Aisenberg meets the claim limitations of claims 17, 18, 60 and 61 and the same have been rejected as explained below.

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3) Remaining claims 10-16, 54-59 have also been rejected under 35 USC 103 (a) as explained below.

*Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1, 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Satou et al (US Patent No. 4,676,194).**

Regarding Claims 1, 45: Satou et al teach a plasma apparatus comprising a plasma source 29 operable to generate source gas ions within a chamber 29, an extraction assembly 25 associated with a top portion of the chamber, and a workpiece support 20 associated with the top portion of chamber 29 (through chamber 27) and securing a workpiece 18 that faces downwards towards the extraction assembly (for example, Fig. 1 and col. 3, lines 42-65). Claim limitation “for implantation thereof” is an intended use limitation, and since the apparatus of prior art meets the claim’s structural limitations, the same is considered capable of meeting the intended use limitations.

In this connection courts have ruled:

A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

**Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 10-13, 15, 16, 54-56, 58, 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satou et al (US Patent No. 4,676,194) as applied to claims 1 and 45, in view of Lob et al (US Patent No. 5,036,252).**

Regarding Claims 10, 54: Satou et al teach all limitations of the claim including extraction electrodes 25 operable to extract the ions vertically from the top of the chamber 29.

Satou et al do not teach plurality of extraction electrodes that are vertically oriented with respect to one another.

Lob discloses an ion beam source (Figures 1, 3) that includes a plasma chamber 1 and an extraction assembly comprising a plurality of extraction electrodes vertically oriented with respect to one another and operable to extract the ions vertically from the top portion of the chamber (Fig 1 Item 6-10 and Column 5, Lines 66-68 and Column 6, Lines 1-4).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use extraction electrode configuration as taught by Lob et al in the apparatus of Satou et al to

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extract and focus the ion beam from the plasma chamber and to accelerate the same for focusing on the wafer surface (column 7, lines 10-20).

Regarding Claims 11, 55: Lob discloses a first extraction electrode (Fig 1 Item 6-10 Column 5 Lines 66-68 and Column 6 Lines 1-4) of the plurality of extraction electrodes is closest to the plasma within the chamber 1 and comprises a plurality of extraction apertures extending there-through (Fig 1 Item 6 Column 5 Lines 66-68 and Column 6 Lines 1-4).

Regarding Claims 12, 56: Lob discloses that the plurality of extraction apertures extends through the first extraction electrode (Fig 1 Item 6-10 Column 5 Lines 66-68 and Column 6 Lines 1-4) collectively have an area associated therewith and wherein a ratio of the area to the total area exposed to plasma defines a transparency, and wherein the transparency is less than 50% (Column 9 Lines 60-68).

Regarding Claim 13: Lob discloses the transparency of the first extraction electrode is about 10% (Column 9 Lines 60-68).

Regarding Claims 15, 58: Lob discloses that the extraction apertures of the first extraction electrode each have an area and wherein extraction apertures of the other extraction electrodes are substantially aligned with the first extraction electrode extraction apertures, respectively (Figures 1, 5 and Column 9 Lines 50-57).

Regarding Claims 16, 59: Lob teaches that extraction apertures of electrode 8 are greater than those of electrode 6. Lob also teaches that apertures in electrode 6 could be made smaller (implying that extraction apertures of electrode 7 could also be greater than that of electrode 6 (column 9, lines 60-68).

**Claim 14, 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Satou et al (US Patent No. 4,676,194) in view of Lob et al (US Patent No. 5,036,252) as applied to Claims 10-13, 15, 16, 54-56, 58, 59 and further in view of Okamoto et al (US patent No. 4,963,735).**

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Regarding Claims 14, 57: Satou et al in view of Lob teach all limitations of the claim except cooling of extraction electrodes.

Okamoto et al discloses an ion beam plasma source (Figures 1, 2b) that includes a discharge tube 10 and extractor electrode 110 that are cooled (column 3, lines 15-35)

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use cooling of extraction electrode as taught by Okamoto et al in the apparatus of Satou et al in view of Lob to enable control temperature of plasma source and obtain proper focusing of the ion beam.

**Claims 17, 18, 60, 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satou et al (US Patent No. 4,676,194) in view of Lob et al (US Patent No. 5,036,252) as applied to Claims 10-13, 15, 16, 54-56, 58, 59 and further in view of Aisenberg (US patent No. 3,961,103).**

Regarding Claims 17, 18, 60,61: Satou et al in view of Lob teach all limitations of the claim except interstitial pumping apertures in extraction electrode.

Aisenberg teaches an apparatus (Figure 1) comprising an ion source 10 with chamber 11 and extraction electrode 24 with aperture 24A and a constrictor electrode 26 (other extraction electrode) that has aperture 26A respectively (interstitial pumping apertures). Aisenberg further teaches that electrode 26 separates the higher pressure sputtering chamber 10 from the lower pressure chamber 20 and enables the plasma to pass more efficiently through electrode 26. Aisenberg also teaches that apertures in the electrodes 24, 26 permit differential pumping thereby maintaining desired pressures in the chambers 10, 20 respectively (column 3, line 40 to column 4, line 15). Though Aisenberg does not teach relative sizes of apertures 24A, 26A, the sizes of the interstitial pumping apertures relative to the extraction apertures would be dependent upon the pressure differential to be maintained between the ion source chamber and near the extraction electrode, as per process limitations.

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Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use interstitial pumping apertures in the at least one of the other extraction electrodes as taught by Aisenberg in the apparatus of Satou et al in view of Lob to maintain differential pumping between the ion source chamber and near the extraction electrode.

**Claims 38-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satou et al (US Patent No. 4,676,194) in view of Lob et al (US Patent No. 5,036,252) and Aisenberg (US patent No. 3,961,103).**

Regarding Claim 38: Satou et al in view of Lob teach all limitations of the claim (as explained above under claims 1, 10-13) including a plasma source operable to generate ions within a chamber having a first pressure and an extraction assembly disposed between the chamber and the workpiece support structure, the extraction assembly comprising a plurality of electrodes (Lob - column 7, line 10 to column 8, line 30).

Satou et al in view of Lob do not teach extraction electrode having interstitial pumping apertures.

Aisenberg teaches interstitial pumping apertures 26A in extraction electrode 26 to enable differential pumping (as explained above under claims 17, 18). Further, claim limitation regarding generation of oxygen ions by the plasma source is an intended use limitation and since the apparatus of prior art meets all the structural limitations of the claim, the same is considered capable of meeting this intended use limitation.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use interstitial pumping apertures in the at least one of the other extraction electrodes as taught by Aisenberg in the apparatus of Satou et al in view of Lob to maintain differential pumping between the ion source chamber and near the extraction electrode.

In this connection courts have ruled:



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A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Regarding Claim 39: Lob discloses that the extraction assembly further comprises a ground electrode 10 disposed between the extraction electrode 7 and the workpiece support structure, and wherein the ground electrode 10 is biased at a voltage of the workpiece support structure that is biased negatively with respect to the plasma within the chamber 10. Further Aisenberg teaches interstitial pumping apertures in extraction electrode to enable differential pumping (as explained above under claims 17, 18){for example, Fig. 1 and col. 5, lines 66-68 and col. 6, lines 1-4 and col. 7, lines 26-52}.

Regarding Claim 40: Lob discloses that the extraction assembly further comprises a suppression electrode 9 disposed between the ground electrode 10 and the extraction electrode 7, the suppression electrode biased negatively with respect to the ground electrode, and operable to prevent electrons local to the workpiece support structure from entering the extraction assembly 9, wherein the suppression electrode comprises a plurality of extraction apertures substantially aligned to the plasma electrode extraction apertures {for example, Fig. 1 and col. 5, lines 66-68 and col. 6, lines 1-4 and col. 7, lines 26-52}. Further, Aisenberg teaches suppression electrode comprising one or more interstitial pumping apertures.

Regarding Claim 41: Lob discloses that the extraction assembly further comprising an auxiliary electrode 8 disposed between the extraction electrode 7 and the suppression electrode 9, wherein the auxiliary electrode is biased negatively with respect to the extraction electrode and positively with respect to the suppression electrode 8 {for example, Fig. 1 and col. 5, lines 66-68 and col. 6, lines 1-4 and col. 7, lines 26-52}.

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*Conclusion*

**Donaldson et al (US Patent No. 6,576,909)** teach an ion source for implantation, comprising a plasma source operable to generate source gas ions within a chamber 14, an extraction assembly 18 associated with a top portion of the chamber 14, and a workpiece support (with workpiece 20) associated with the top portion of chamber that faces towards the extraction assembly 18 (for example, Fig. 1 and col. 3, line 45 to col. 4, line 65).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Rakesh K. Dhingra



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Art Unit 1792